

What is claimed is:

1. A vehicle radar apparatus comprising:
 - 5 transmitting means for transmitting a transmission signal which is frequency modulated so as to change continuously in frequency;
 - 10 a plurality of receiving means, disposed at predetermined intervals, for receiving reflected waves when said transmission signal is reflected by an objective and for generating a plurality of received signals;
 - 15 beat signal generating means for generating beat signals each corresponding to a frequency difference between said transmission signal and each of said received signals generated from said plurality of receiving means;
 - 20 converting means for extracting a peak frequency of at least one beat signal generated from said beat signal generating means and for converting a phase difference of the beat signal at said peak frequency into a frequency signal; and
- 25 judging means for identifying said objective with a close range road surface or raindrops when a peak frequency intensity of said frequency signal converted by said converting means is smaller than a predetermined criterion intensity.
- 30 2. The vehicle radar apparatus in accordance with claim 1, wherein said judging means determines said predetermined criterion intensity with reference to the peak frequency intensity of said beat signal.
- 35 3. The vehicle radar apparatus in accordance with claim 1, wherein said judging means determines said predetermined criterion intensity with reference to an average intensity which is obtained by averaging the peak frequency intensity of respective beat signals.

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4. The vehicle radar apparatus in accordance with claim 1, wherein
said transmission signal includes an ascending section in which the
frequency ascends in a predetermined frequency range and a descending
section in which the frequency descends in another predetermined frequency
5 range,

10 said converting means extracts, as the peak frequency of said beat
signal, an ascending section peak frequency and a descending section peak
frequency in said ascending section and said descending section of said
transmission signal, respectively, and converts the phase difference of
respective beat signals at said ascending section peak frequency and said
descending section peak frequency into an ascending section frequency
signal and a descending section frequency signal,

15 said judging means identifies said objective with the close range road
surface or the raindrops when an ascending section peak frequency intensity
of said ascending section frequency signal is smaller than a predetermined
criterion intensity determined with reference to an ascending section peak
frequency intensity of said beat signal, and when a descending section peak
frequency intensity of said descending section frequency signal is smaller
than a predetermined criterion intensity determined with reference to a
20 descending section peak frequency intensity of said beat signal.

25 5. The vehicle radar apparatus in accordance with claim 1, wherein
said judging means executes judging processing for comparing the peak
frequency intensity of said frequency signal with said predetermined
criterion intensity only when the peak frequency of said beat signal is
generated in a predetermined low-frequency region.

30 6. The vehicle radar apparatus in accordance with claim 5, further
comprising speed detecting means for detecting a vehicle traveling speed,
wherein said judging means changes the range of said low-frequency

region in accordance with the vehicle traveling speed detected by said speed detecting means.

7. The vehicle radar apparatus in accordance with claim 1, wherein
5 said converting means calculates the intensity of each frequency by executing frequency analysis on each beat signal, and extracts the peak frequency of said beat signal based on the result obtained by averaging the calculated intensity of said each frequency among respective beat signals.
- 10 8. The vehicle radar apparatus in accordance with claim 1, wherein said judging means repetitively executes judging processing for comparing the peak frequency intensity of said frequency signal with said predetermined criterion intensity at predetermined periods, and identifies said objective with the close range road surface or the raindrops based on
15 judgment result obtained through a plurality of comparisons.